THE NAVY & MARINE CORPS AVIATION SAFETY MAGAZINE

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Approach

LANDING

It ain't over till it's over

The Navy & Marine Corps Aviation Safety Magazine

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Mishaps cost time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces and put them in hospitals, wheelchairs and coffins. Mishaps ruin equipment and weapons. They diminish our readiness. This magazine's goal is to help make sure that personnel can devote their time and energy to the mission. We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is hazardous; the time to learn to do a job right is before combat starts.

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CON

Features

Focus on Landings

You put a lot of time and effort into the mission brief, do a thorough preflight, check weather, and manage many details before getting airborne. Then you fly the mission, putting all your skills and experience to the test. You include ORM and CRM in every aspect. Then you RTB and face the most important part of the flight: landing. Much emphasis is given to every aspect of the flight, but, bottom line, nothing else counts if you don't safely return to Mother Earth.

In this issue we asked the experts to discuss landing an airplane. Fixed and rotary wing pilots share their stories, along with their insight and techniques, with the intent to raise awareness to this phase of flight.

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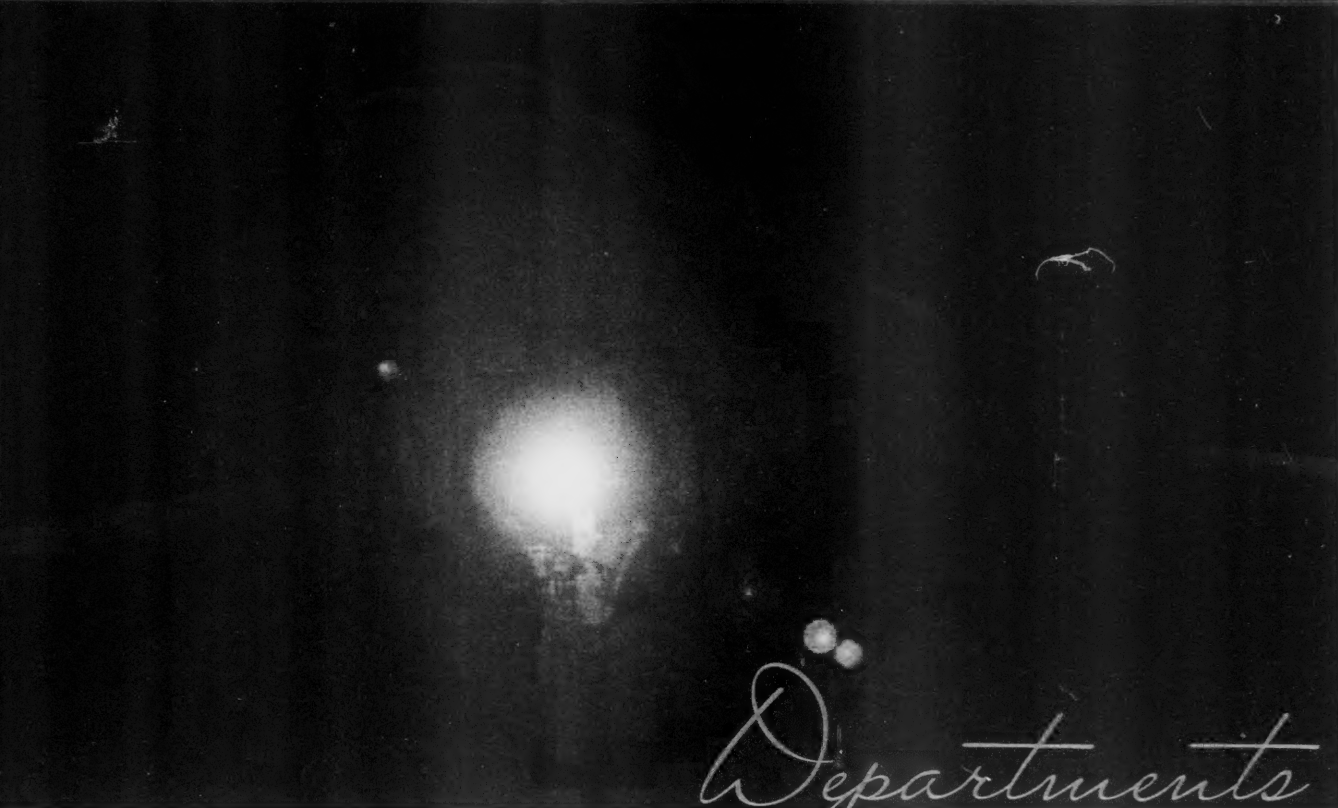

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Thanks for helping with this issue ...
Lt. Michael Ferrara, VAW-120
Lt. Jason Grose, VP-45
1stLt. Jason Dempsey, USMC, HMH-461
Capt. Samuel Richard, USMC, VMM-263(REIN)
LCdr. Clay Shane, HSL-51
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Back cover: Words by Lt. Wes Yancey, HSC-2.

The Initial Approach Fix

Photo by MC3 Kristopher Wilson.

I NOW UNDERSTAND what it's like to have an appreciation tour. In every command I've been in, safety always was emphasized, and I always felt it was the priority—that's what we preach and that's what we believe. Then I got this job as the Head of the Aviation Safety Directorate at the Naval Safety Center, and safety took on a whole new meaning. Try to surround yourself with more than 200 coworkers who have a passion for what they do and not have that passion rub off on you—my view of safety is changed forever.

In the past two years we have seen improvement in our aviation-mishap rates, and that translates to lives saved, less injuries and better combat readiness. All good stuff. But that improvement doesn't happen by circumstance. I'm not only talking about the efforts of our Safety Center staff, but about all of you—the professionals throughout the fleet. The Naval Safety Center is just one part of the team, and we can only do so much. Our safety surveys, maintenance risk-management presentations, culture workshops, and ORM programs, along with our analysts, investigators, aeromedical folks, maintainers, and *Approach* and *Mech* staff and contributors, continually support fleet safety professionals keeping Sailors and Marines on the job and mission ready.

We can help with the management, tools and resources of your safety program, but I believe now, more than ever, it is up to each one of you to take the responsibility, not only for yourself, but for your coworkers, your aircraft, and the mission. Ultimately, the success of Naval Aviation depends on many people including leadership, operators, maintainers, civilian personnel and all who support Navy and Marine Corps Aviation—you are part of the team.

Keep looking to the future. The programs we have in place are a solid foundation for mishap prevention, and I'm excited for where we're going in our efforts. Continued emphasis on human factors (HFACs) analysis and fatique management are reaping great results, as is our progress with WESS aviation development. Risk management, as a part of everyone's life—24/7, on and off duty—will keep our people mission ready. Making the right decision in a dynamic and sometimes hostile environment is the challenge we face, and a solid time-critical ORM framework is critical.

Photo by John Williams.

Whether we talk about readiness, resources, people, morale or mission accomplishment, I now fully appreciate how safety is integrated into everything we do and essential to our success.

I've just turned over this job to Capt. Mike Zamesnik, a helo bubba who comes here after serving as DCOS Aviation, Board of Inspection and Survey. It's his turn to get a great appreciation tour here at the Naval Safety Center. Thanks for all your support!—*Clyde*

Capt. Ed "Clyde" Langford will take command of Cruise Missile Support Activity Atlantic.

For LSOs embarked at sea, no other phrase elicits more apprehension as these four words:

PADDLES TO THE PLATFORM!

By Cdr. Robert Wedertz

More often than not, this 1MC announcement means an aircraft from the previous launch is returning early because of a minor malfunction, or the landing signal officer (LSO) team responsible for that day's recoveries had spent too much time jacking around and is late for the next recovery.

In the case of the former, paddles must quickly make their way to the aft end of the ship with as few injuries as possible. (Legend has it that one of the most famous LSOs of all time, Cdr. John J. "Bug" Roach, was void of all skin on his shins because of the number of times he was required to traverse the countless knee-knockers between the forward wardroom and the LSO platform.)

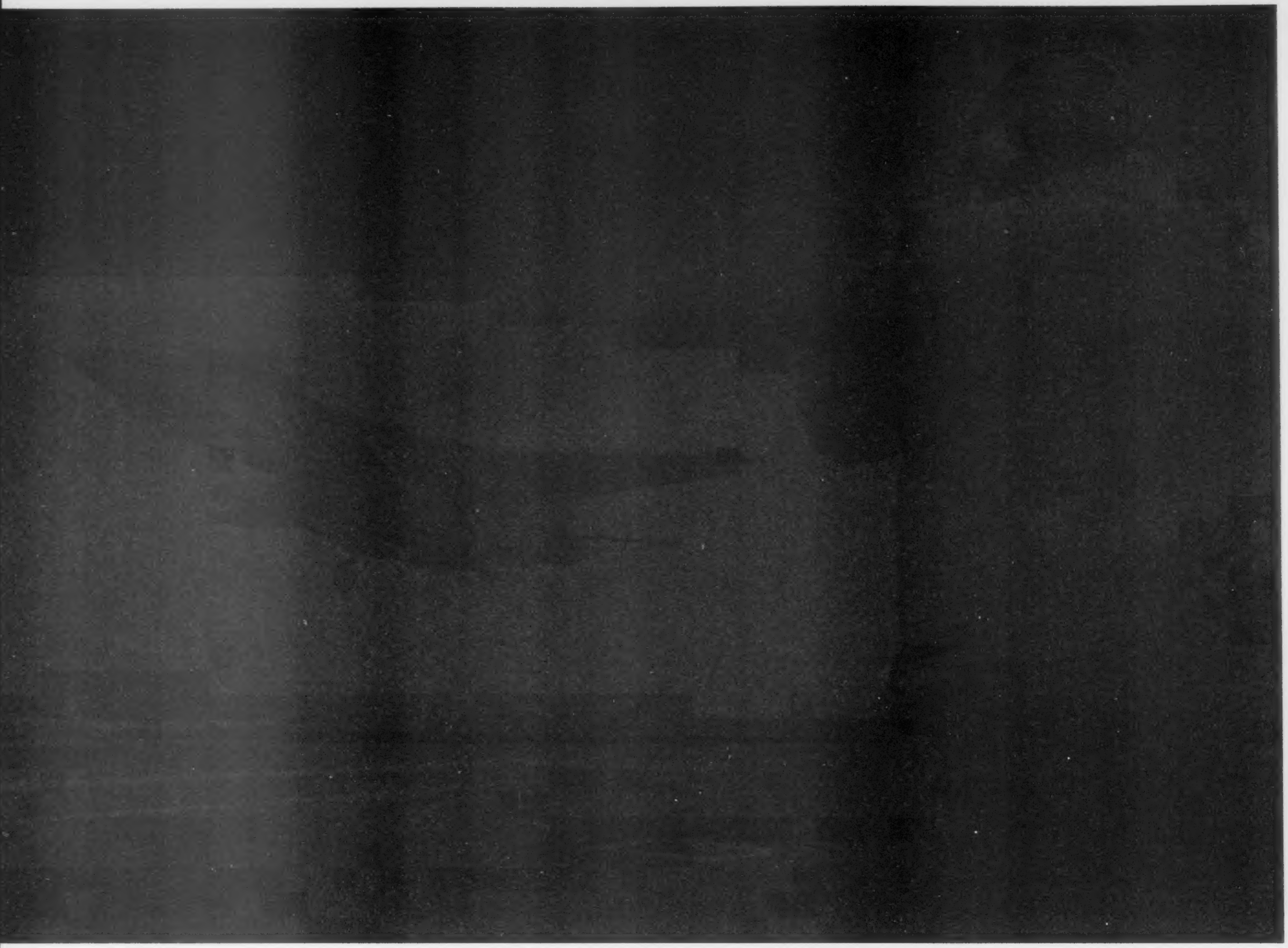
All LSOs who've waved for any period of time, however, can easily reminisce about a single harrowing event, an event that indelibly changed their perspective of the mostly routine nature of recovering onboard aircraft carriers. For me, that day involved my first at-sea period as a newly designated CAG LSO during a COMPTUEX. Our air wing was operating under the watchful eye of COMCARGRU Four as we worked for our blue-water certification. For a CAG LSO, no other evolution is shrouded with "so little to gain, yet so much to lose." To my recollection, no CAG paddles ever won an award for making sure the air wing received their cert; however, quite a few have lost extremely vital parts of their anatomy for not getting it.

I stood in ready room 6 watching one of my LSOs debrief a rather lackluster pass to an F-14 driver (most of their passes were that way), when the "Paddles to the platform" call snuck into the room. Scant few 1MCs were operational in Tomcat ready rooms back in those days. The noise of myriad announcements during general quarters tended to interrupt the roll 'em.

I immediately directed the team to head to the platform. Following them, I imagined what scenario would present itself once outside the skin of the ship, maybe a Hornet with an AMAD caution, or a Prowler with slat issues. I was not prepared for the situation as we opened the water-tight door near frame 230. It was just after 1500, the sky was as dark as the night before at 2300, and it was raining sideways.

To fully capitalize on the synthetic training available during this COMPTUEX, the captain and the navigator had found the only severe thunderstorm in the entire VACAPES operating area. They had parked "mom" right in the middle of it. As you would expect, my raingear was in my stateroom on the O-2 level, some 150 frames away. This event was going to be fun.

As the V-2 folks got the platform raised and began the task of hooking up handsets, the phone rang. The air boss had something on his mind. "Paddles, we're bringing event four back early, the weather is dog-squeeze, there's icing up to 35,000 feet, expect a Case



It was just after 1500, the sky was as dark as the night before at 2300, and it was raining sideways.

III recovery, with the first aircraft at four miles."

I did my best Vince Lombardi and told the team, "This is what we get the big bucks for" (roughly an extra dollar a day in flight-deck, hazardous-incentive pay). As we readied the platform for what would be an extremely interesting recovery, I got a little edgy. The deck was relatively steady, but I couldn't see the island from the platform. I could only wonder what the visibility would be like at three-quarters of a mile. As it turned out, I didn't have to wonder.

As CATCC handed off the first aircraft to paddles, I heard, "601, slightly left of course, above glide slope, call the ball," to which the rightseater in the Hawkeye replied "clara." Not only could they not see us—even with their windshield wipers approaching 325 swipes per minute—much to my disappointment, I couldn't see them.

"Wave off, wave off" I directed. Alright, I've heard this one before, just make the call paddles, "99, taxi lights on." This event was going to get very interesting.

LSOS ARE TAUGHT at the very advent of their waving careers to maintain the proper perspective when on the platform. That perspective is defined in many ways, and perhaps the most effective is viewing the carrier landing from the eyes of the person you're waving—each and every time. Doing that in these conditions added a level of anxiety well beyond that experienced

during normal ops. If aircrew couldn't see the ship, paddles would need to talk every airplane all the way into the "spaghetti." LSO talkdowns are an art form unlike any other. Some paddles do their best John Wayne impression on the radio. Others tend to "love" the pilot into the wires, sounding like they're looking for a date. Despite the flavor of the voice, the calls paddles make are vital to the recovery of airplanes in varsity conditions. LSOs are required to metaphorically strap themselves into the airplane they are waving and fly it all the way to touchdown using a vernacular that is foreign to the uninitiated.

The second airplane down was an F-14, the driver of which also happened to be an LSO. He would be undeniably keyed up as he came down the chute, glued to his instruments, and surrounded by an ethereal world of rain streaks and lightning. CATCC called, "205, three-quarters of a mile, right of course and correcting, call the ball."

"205, clara."

"Fly your needles," I replied. I still couldn't see him, despite being sure he had his taxi light on.

After what seemed like 30 seconds, but probably was closer to one and one-half, there it was, a faint light, almost where I expected it to be.

"You're a little low. Come left. A little power. There's centerline. Back to the right. Back to the right. Power. Come left. You're a little overpowered. You're a little high. A little power to catch it. DLC, DLC, don't climb." Touchdown.

Twenty seconds of pure terror and adrenaline, and a 54,000-pound airplane and its two crewmembers were on deck amidst a wash of rainwater and soaked-to-the bone flight-deck personnel. Sixty or so seconds more and we get to do it all over again. Twenty-nine passes later and the remaining 10 airplanes were on deck. No one got hurt, no one diverted back to the field. What at first glance had been one of the most terrifying recoveries I have ever been a part of quickly became just another day at the office.

As I made my way below decks to do the standard walk-around debriefs and empty my flight boots of rainwater, I finally let go of the pent-up sigh I had retained for the last 45 minutes. I was eager to get into some dry clothes, and even more eager to talk to the air wing and get their take on the recovery. Our first stop was ready room 8, where the pilot of 205 still was at the maintenance desk vainly trying to type up his yellow sheet with his trembling hands. He turned to face us, and his eyes were like saucers. I awkwardly asked him if he enjoyed his flight. He grabbed me, my team lead, and the backup LSO in one swift motion, and gave us a bearhug that was void of stereotypical male ritual.

"Thanks, paddles" was all he said. I replied, "No worries," and did an about-face and headed forward to ready 7. There wasn't much more to say.

Landing aboard an aircraft carrier is never easy and seldom routine. Very few other professions can be so utterly rewarding—and at the same time so extremely unforgiving in the same exact moment—as waving airplanes. That day still reminds me of why I chose this vocation, and why I continue to stick around today.

Cdr. Wedertz is the Officer in Charge of the LSO school, NAS Oceana, Va., and was a CVW-7 LSO.

The LSO School teaches new LSOs the basics of glideslope geometry, aircraft characteristics and standardized voice calls. Located at NAS Oceana, Va., the LSO School incorporates instructor lectures, computer-based training, and a LSO trainer (a virtual reality simulator to display Navy aircraft landing aboard an aircraft carrier for students to "wave" in an environment that can be programmed to match any sea state or weather condition.)

The LSO always has been and will continue to be the keystone of naval aviation. The LSO School is proud to carry on the tradition of providing quality training to the fleet's LSOs, preparing them for that dark night on a pitching deck when they will be the last measure of safety for a pilot, crew and his aircraft, as they land aboard a carrier.

Visit the LSO School online at: https://www.portal.navy.mil/comnavairfor/LSO

LEVEL OF TRUST

By Lt. Matt Antel

I was embarked with Carrier Air Wing 1 on USS *Enterprise* (CVN-65). We just had departed from Norfolk for a six-month deployment. While flying a routine, afternoon FA-18 training mission, the summer weather deteriorated to the point that all aircraft were recalled to the ship.

I was part of a group that just had launched. Another wave from the previous event were airborne and in line to recover before me.

As the air wing converged on the ship, every aircraft was shuffled into the marshal stack. While waiting overhead, large thunderclouds continued to develop, and I found it more and more difficult to keep from flying into zero-zero conditions.

With the radios tuned to the approach frequencies, I heard the play-by-play as the first few aircraft approached the ship. The first call that was broadcast by paddles was "99, taxi lights on" for recovery. Normally, carrier-based aircraft recover with only their exterior and approach lights on at night, and with lights completely out during the day. A request for taxi-landing lights to be switched on for any recovery meant that visibility was low, and paddles couldn't see an approaching aircraft until it was well inside three quarters of a mile from the ship.

At times like this, pilots must rely on the skills they have built since day one of their carrier-aviation training, while also placing an enormous level of trust in the LSO cadre. Landing a jet on an aircraft carrier is never a routine event, but it becomes all the more harrowing with challenging environmental conditions.

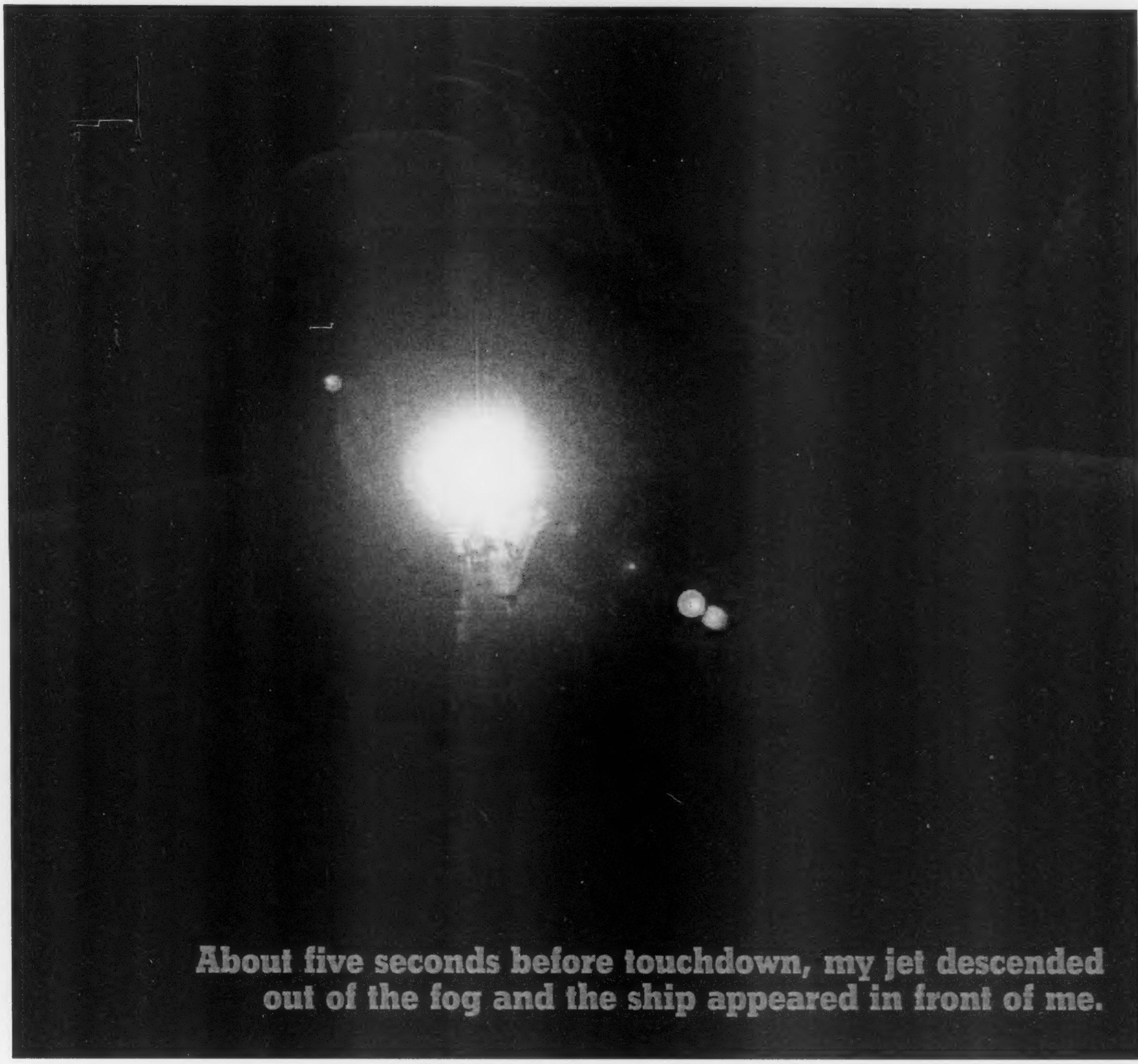
As more and more pilots struggled to get aboard because of high seas and reduced visibility, the approach controller would push further back everyone's approach time. I faced the added challenge of closely managing my fuel while waiting for what assuredly would prove to be a difficult approach.

As my fuel slowly burned away, I knew if I did not get aboard on my first pass I would face a trip to the tanker, or an emergency divert to an unknown airfield in a foreign country.

Finally, my turn to commence the approach arrived. Reaching my approach fix, I accelerated to 250 knots, extended my speed brakes, and began my descent on a standard Case III recovery profile. The whole time, I could hear paddles talking other pilots aboard as the deck pitched and rolled in the high seas. At the three-quarter-mile ball call, pilot after pilot reported "clara ship," signifying their inability to see any part of the carrier. Once paddles could break out the bright approach light, they would call "paddles contact" to the pilot, and deliver power and line-up calls to get the aircraft in sync with the flight deck. Anytime paddles did not think the approach should continue, he would signal wave off. In conditions like these, an overall recovery rate of 50 percent is considered a success.

I leveled off at 1,200 feet and turned to intercept the specific course to drive me toward the ship. Just inside 10 miles, I extended my landing gear, dropped the arresting hook, decelerated to approach speed, and completed my landing checklist. As I looked through the windscreen, the conditions were truly zero-zero. The conditions were so thick that my taxi light reflected off the clouds, making the possibility of breaking out even more remote.

AT THREE MILES, I followed my instruments and tipped over to intercept the 3.5-degree glide slope that would eventually lead me to the ship's landing area. Visibility was not improving, but I was encouraged that the previ-



ous three aircraft had recovered, mostly thanks to the skill of my colleagues on the LSO platform.

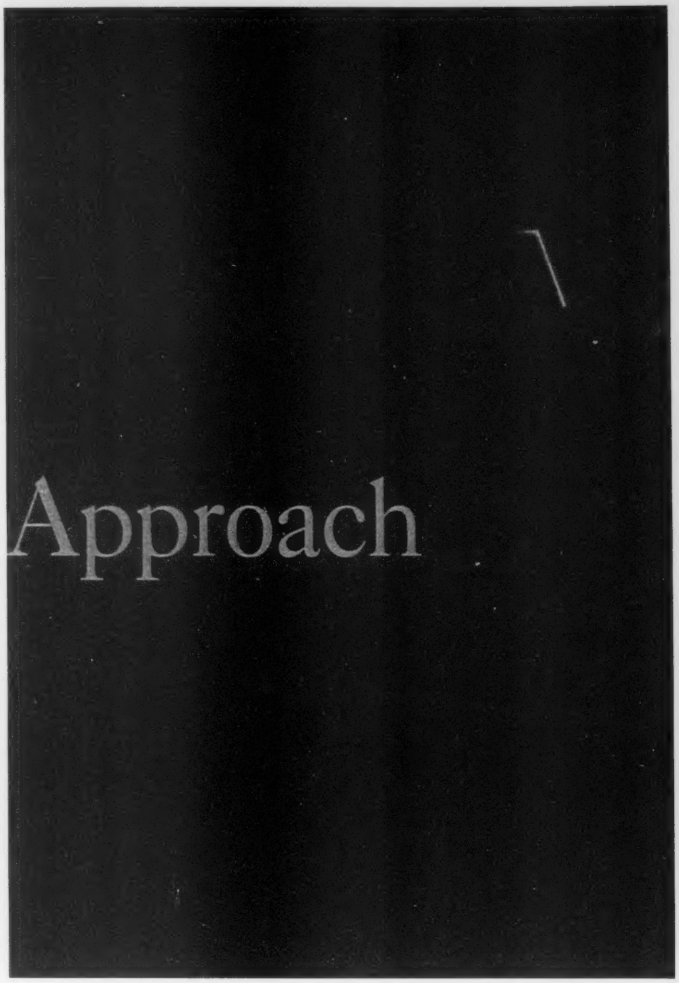
At one mile, I glanced at the water, and barely made out the whitecaps. That's usually a good sign that you're about to break out, but my forward visibility still was zero. Three quarters of a mile from the ship, the approach controller directed me to "Call the ball," implying that I should be able to see the landing area and the visual glide slope. I saw nothing, and replied with, "Clara ship," just like all the aircraft that came down before. Soon, the LSO responded, "Paddles contact, you're on glide slope."

Paddles talked me down to a landing. At this point, my job consisted of listening to paddles and responding to his voice calls. Unlike a normal approach, I only was aware the ship was getting closer and closer. Failure to properly respond to LSO calls could have led to disaster.

About five seconds before touchdown, my jet descended out of the fog and the ship appeared in front of me. Touchdown occurred so quickly I had no opportunity to do anything more than make a last-second check of lineup and advance my throttle to full power. I then felt my jet abruptly decelerate after catching a wire.

Lt. Antel is with the LSO school, NAS Oceana, Va., and flew with VFA-211.

Night Carrier Approach



By Maj. Ben Taylor, USMC

Thirty minutes after sunset and the final glow over the western horizon is barely visible. The good news is tonight should bring a full moon; unfortunately, it won't appear until two hours after my recovery.

I continually dim my cockpit lighting as I hold 20-plus miles behind the ship, going over my checklist for the third time in as many minutes. I have 10 more minutes of holding until my expected approach time, which seems like an eternity. Enough time for a sip of water, maybe eat a granola bar. My wingman is holding 1,000 feet below me, and occassionally I see his jet whiz by in the opposite direction as he manages the time-distance problem.

"99, the time in 30 seconds is time 45… 3, 2, 1, mark, time 45." Marshall's time hack shows a three-second discrepancy between ship's time and my aircraft GPS, just like it has been all of cruise.

My stomach begins to churn as I realize I am now only four minutes from commencing. One last review of my penetration checklist, and I realize my external lights are not full bright. What else have I missed? As I begin my last inbound leg, I am indicating 240 knots groundspeed, which equates to four miles a minute. My commencement point is 6.2 miles ahead, and I have 90 seconds of time remaining; timing looks good.

"Marshall, 201 commencing 6.7, altimeter 2995."

My wingman has just commenced, reassuring me that I have one minute to go. Sixty seconds later, I drop my nose, pull power, and begin the approach.

Aviate, navigate, and communicate. I have heard this verbiage since flight school, but I still have to constantly remind myself. I descend at 250 knots into the dark abyss that is reproducible only in a simulator. I focus on my airspeed, altitude, and rate of descent. The sun is gone, the moon has not risen, and the eerie feeling of having no visual cues is present. My gross weight is 1,500 pounds above max trap, so I begin to dump fuel to compensate. I pass 5,000 foot AGL and decrease my rate of descent as marshal switches me to approach. As I select button 15 in my No. 1 radio, I hear paddles conducting radio checks. "Have you the same, 30 knots down the angle." The winds nearly are ideal; a small mental victory.

As I continue my descent to 1,200 feet, I am reminded of a sea story my old XO told me. When standing on the platform one night as an LSO, he and the other paddles saw a bright flash 15 miles behind

the ship, then darkness. Later, they learned an aircraft had flown into the water. No one knew what happened, but the learning points are clear: compartmentalization, radalt discipline, adherence to the minute-to-live rule, and basic air work.

Is that a ship I see off my right side, maybe a tanker? I wonder what country it's from, and where it is heading. Can they hear me flying over? Amazing, 15 seconds after I reminded myself to focus, I'm already distracted. Can flight docs diagnose ADD?

SIX MILES TO GO until my arrestment, and I am dirty, trimmed up, and on-speed. ACLS and ILS are working, so I begin to declutter my HUD. I'm 500 pounds above max trap and secure my dumps. The carrier clearly is visible, a single-point light source in the middle of a dark nothingness. I remind myself of the visual paradox that will result. I will feel high and have to fight the urge to pull power. I must trust my instruments.

"Power back on… bolter, bolter, bolter."

Some poor soul just bought another 0.3 hours of flight time after missing all four wires. I visualize the chain of events that result. Someone is making a decision based on his fuel state whether to have a tanker hawk him. His CO is getting the hairy eyeball from CAG in CATCC while the other COs, XOs, and CATCC reps breathe a sigh of relief that it was not one of their pilots that just caused the carrier and its 5,000 plus people to steam into the wind for longer than expected. In the ready room, squadronmates hoot and howl as they move the bolt from above the chair of the last bolter dupe to the chair of the new victim. Once I am on deck it will be funny, but until then it makes me want to puke.

Two miles from touchdown, my wingman just has trapped. I visualize paddles grading the pass, switching their radios to my frequency, and beginning to make mental notes of my energy state, glideslope, and lineup.

"205, slightly above glideslope, three-quarters of a mile, call the ball."

I make my ball call, and paddles responds accordingly. Fifteen seconds to touchdown, my scan consists of meatball, lineup, and angle of attack. I am lined up a little left, so I add a little power and correct back to the right. Woops, a little too much power, as I cross the ramp and stop the rising ball. The touchdown surprises me, as I feel the immediate decel. My left hand selects full military power, and I secure my external lights. I breathe a sigh of relief that I am on board, and immediately begin to relive the pass in my mind.

I taxi out of the landing area. I hope paddles didn't see my full high deviation crossing the ramp, but I know they did. I know my pass will be graded safe, but I won't get the OK I was shooting for, so a tinge of disappointment sets in. My taxi director is trying to get me to hurry up, kicking his right foot like he is stomping on a car accelerator. I wonder if he knows my legs still are shaking? The next aircraft just trapped, and I am thankful I don't have to taxi forward of the shuttles for the bow catapults as they turn me toward the tower.

Another small victory. Shutting down, I begin to unstrap as another aircraft bolters. Now I can laugh, poor SOB. It may be me tomorrow night, but it's not me tonight, and that's all that matters.

I wonder what's for mid-rats?

Maj. Taylor is with the LSO school, NAS Oceana, Va., and flew with VMFA-251.

By Lt. Wesley Yancey

Flight preparation consists of hours of studying, pouring over publications, procedures, performance, and tactics. Yet, do we have the right priorities when we fly? A lot of energy is invested in the mission objectives and conduct of the flight. However, one of those fundamental regimes of flight, which demands persistent execution of the basics, and many times not given needed emphasis, is landings. No flight would be complete without it.

Let's skip the epic tails about, "… a galaxy, far, far away," or "It was a dark and stormy night," and get to the punch line: the coveted landing. If that final note reads like a comment about Lt. Launchpad McQuack, "Don't bother having him land, there's no time for another disaster," then you might want to look up the number for that truck-driving school. If an 18-wheeler is not yet your calling, then I offer the following for your consideration.

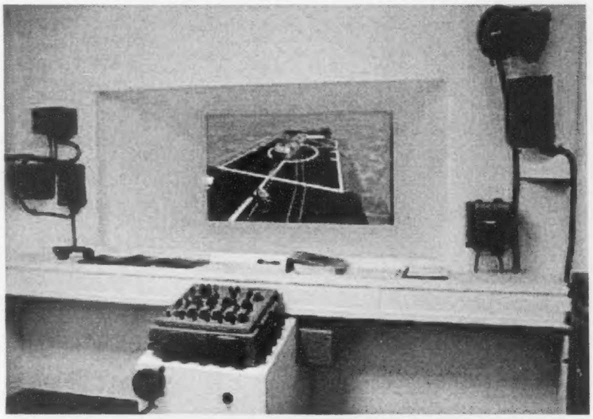
It's not whether we are going to meet Earth again, but rather the terms of our return. Consider the regions of the high seas and points of the globe we may find on final approach. We must train and prepare for a demanding spectrum of conditions. After much labor, refinement of technique, and skill, comes experience, which can be reduced to the concept of see one, do one, teach one.

You may say, "I have seen this before" and "I know what I am doing." This mindset is healthy to a certain degree, and aviators thrive on this confidence. We tend to develop a level of comfort with familiar territory. But complacency can overtake confidence and decouple us from the fundamentals. We slip with the basics, our procedures, and adherence to standards, and then drift from disciplined execution. Although landings may not pose a significant risk in some situations, we may not give them enough focus every time. Statistically, landings have the highest mishap rates compared to any other phase of flight.

Most of us feel comfortable at sea, yet this challenging environment can be volatile at times. To reduce risks at sea, we have put specific procedures, systems and programs in place.

Every ship runs their flight operations slightly differently from others, but within the published guidelines, which means communication and teamwork are essential.

Procedures are a fundamental element in flying. However, as is boldly stated in NATOPS, procedures are not to preclude sound judgment. To get to the landing, the aircraft has to be configured, which gives way to procedures and the use of checklists. Little details may catch you, such as brakes not properly set, equip-



The Atlantic Fleet Helicopter Operations School (HELIOPS), based in Norfolk, Va., prepares ship's crews for flight operations. Under the watch of the Fleet Replacement Squadron (FRS) for the MH-60S, the "Fleet Angels" of HSC-2, HELIOPS provides training and standardization input to fleet aviation and non-aviation forces, as well as foreign military and civilian contractors. The core curriculum includes helicopter-control-officer (HCO), landing-signalman-enlisted (LSE), and night-vision-devise (NVD) training. The civilian and military instructor staff hones student's skills in the art and science of helicopter-flight operations. The focus is on safety and sound implementation of procedures.

Complacency can overtake confidence and decouple us from the fundamentals.

ment not secured or stowed, or a crew not focused or prepared for the landing. The NATOPS checklist is the starting point for any procedure. Don't let simple, routine items preclude you from following the book. Adherence to basic procedures, publications and training are critical ingredients to sound judgment.

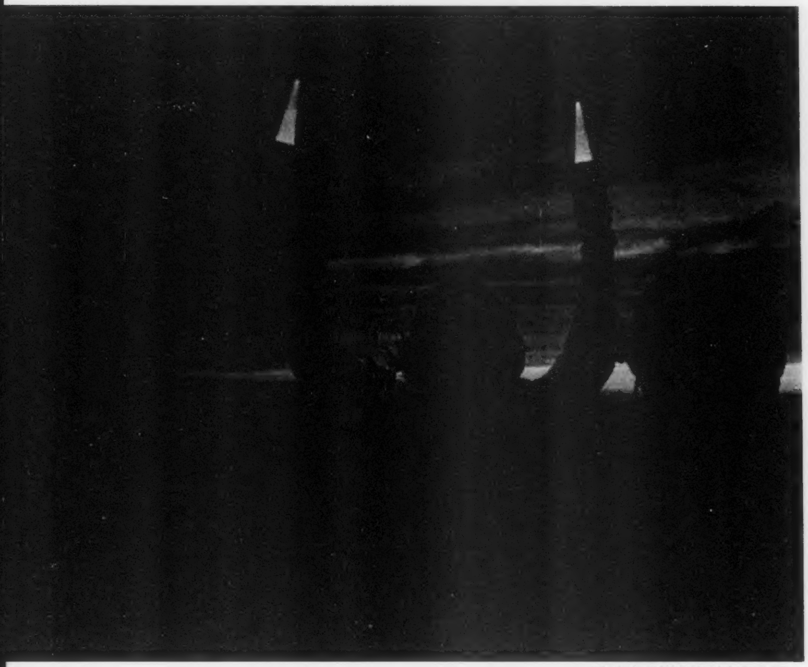


Photo by PH1 Robert J. Fluegel.

A scenario that certainly would heighten our sense of routine is an emergency. Given a disabled aircraft, however minor or severe, one of our initial urges is to immediately get the aircraft on deck. We train to this occasion, and practice our procedures and checks. Even with this training, the actual emergency may not be exactly what we trained for. As a result, because of a lack of understanding of the situation, trust in the reliability of the aircraft, or confidence in our ability to fly an emergency approach, we may rush into a landing. Again, sound judgment is critical in these situations.

ANY DISCUSSION OF LANDINGS would be incomplete without mention of the aircrew. A critical component for the pilot in a multicrew aircraft is the use of the eyes and ears of the other crewmembers. I think we do a good job as a community with crew engagement in all phases of flight, but it's important to emphasize each persons contributions.

For shipboard operations, bad conditions can exist under any circumstance or environment. In what would be considered the more stable environment of land-based operations, we can and certainly have gotten into trouble, partly because there is more to hit, and we're often not used to operating in some inland areas. I think we can agree that landing at a prepared field on your average day does not present a demanding finish to a flight. Yet crews have made landings while braking antennas, damaging blades, FODing out engines, collapsing struts and even digging into the farm during what was considered a routine operation.

During tactical, training, operational, and humanitarian assistance/disaster relief (HA/DR) missions, we find ourselves in dynamic situations that capture our attention. Tremendous effort goes into the planning and preparation for these flights. External and internal pressures can result in the aircrew losing some situational awareness. We spend so much time focusing on getting the mission done, that the landing which brings us back home is sometimes left as an afterthought. Is this acceptable?

As we build experience, and after having done something a few times, a routine sets in. We train to make landings anywhere, at anytime, which is part of using the amazing machines we fly in the vertical-lift community. Although landings may become routine, every landing is earned, whether you think about it or not. Is the flight over before you get to the chocks and the aircraft is shut down?

Lt. Yancey is an FRS instructor at HSC-2 and the HELIOPS Division Officer.

Carrier Aviation 101:

A Layman's Guide to Day Ops Around the Ship

By Lt. Kate Stockton

Because the aircraft carrier environment is so dynamic, aviators have a "rule book" that governs all carrier flights: CV NATOPS. It includes procedures all aviators live by. Here's a "CliffsNotes" version on how we operate during the day.

I fly inbound the carrier and check in with the ship's air-traffic controllers, praying I don't screw up the comms and sound like an idiot. They respond with all pertinent ship information, including weather, winds, and type of case recovery, such as what point in the sky to head to, whether it be Case I overhead the ship for good weather, or for bad weather, marshal instructions for Case II or III. I learn that it's Case I. Part of me is glad, because as aviators, we inherently like flying in nice weather. The other part of me gets a little nervous, because I know there's more to mess up during the Case I pattern than for the Case III straight-in.

"Who's my interval?" "When do I commence?" "Man, I don't want to cut CAG out of the pattern, again."

I head overhead the ship, and start straining my eyes to look for my interval. I start my left-hand, 360-degree turn at my preassigned altitude, and continue to rake the sky for the guy I'm supposed to follow. We're past our scheduled recovery time, and the launch is starting to wrap up. "Crap, I still don't see my interval."

I continue to scan just below the horizon, maneuvering my aircraft so my eyeballs can see more sky. As I finish my turn, starting to sweat whether I've missed my chance to follow my interval, I see him. I relax a little and position myself behind him. Time for commencement comes and I descend from my holding altitude, in a toilet-bowl-flushing sort of way. I proceed to 800 feet and three miles behind the ship, otherwise known as the initial. Once at the initial, I fly inbound on the ship's base-recovery course and overfly the carrier, slightly offset to the right. "Crap, I forgot to turn my dumps off again. I'm sure to catch flack from paddles for that." Once upwind of the ship, with my interval in sight, I roll 60-degrees angle of bank, bring power to idle, and make a level-altitude break.

The break is a 180-degree turning maneuver, designed to get my aircraft on the ship's reciprocal heading (downwind). I need to slow down to lower my landing gear, flaps, and hook, and descend to the landing-pattern altitude of 600 feet. Once on the downwind heading, with landing gear and arresting hook down, I'm doing and redoing my landing checklist. I also listen for winds and look for a good abeam distance, the point to turn back to ship's heading for arrestment.

During this 180 degrees of turn, my breathing picks up, my legs start to shake, and I start a descending turn at a controlled rate to arrive behind the ship in what's called the "groove." The groove is ideally a three-quarter-mile distance from the back of ship to arrestment, to equal about 15 to 18 seconds of elapsed time. I can see I'm going to overshoot centerline, and sure enough, here comes the blessed, "Keep your turn in" call from paddles.

I roll out and correct back to centerline and see that I'm high. Looking at our primary visual-landing aid called the improved-fresnel-lens-optical-landing system (IFLOLS), more commonly known as, the "lens" or the "ball," I make a timely three part power correction to stop the ball from rising. The lens gives me information on where I am on glide slope, which is a controlled path of motion I must fly to touch down if I want to catch a specified arresting wire. I pour all my focus that that beam of light that shows me where I need to be. My heart is racing, my breathing is shallow, and I realize I'm staring at the ball with such intensity that only paddles' "Right for lineup" call slaps my scan back into shape. Meatball, lineup, AOA. Meatball, lineup, AOA.

Roughly 18 seconds later, I feel the heavenly tug of the arresting wire catching my aircraft. I breathe a sigh of relief as I taxi clear of the landing area. I focus on the yellowshirt giving me direction, but I can't help but replay the pass over in my mind, critiquing myself. I may continue my string of yellows (fairs) for that overshoot, but at least I got aboard.

Lt. Stockton is with the LSO school, NAS Oceana, Va., and flew with VAW-112.

HELICOPTER LANDINGS—Techniques and Problems

By Lt. Mark Fleenor

Helicopter landings are a tricky business. The shipboard environment, in particular, is very unforgiving of errors. A good strategy to prevent the next mishap is to go back to the basics. The easiest way to discuss the basics of a safe vertical landing is to go to where every Navy, Marine Corps, and Coast Guard helicopter pilot learns to land: the training command.

The highly procedural and regimented program of the training command is an excellent reference for emphasizing the basics of vertical landings. Students are given a book that tells them how to land; if only it were that easy. The Contact Flight Training Instruction (FTI) breaks down a vertical landing as follows:

Smoothly lower the collective to begin a slow rate of descent.

Use pedals to maintain heading and cyclic to eliminate drift.

The rate of descent may slow or stop as the helicopter nears the ground. Continue the descent with slight collective pressure.

When on the ground, smoothly lower the collective to the full down position.

A sound scan also is required before any landing. The hover-scan technique taught at the training command is "out, down, and in." This same scan procedure also is used for the vertical landing. The "out" portion of the scan involves using the horizon for attitude and heading information. "Down" involves specific checkpoints near the aircraft that give altitude and drift information. The "in" portion of the scan involves monitoring instruments and Nr. The greatest emphasis on technique leans heavily on the out and down portions of the scan as CRM allows your copilot to assist in monitoring instruments.

A breakdown in any portion of this scan negates the basic vertical-landing steps listed above, and may contribute to a mishap. A common error among students is to fixate on one part of the scan, and inevitably leads to drift. The pilot who uses a complete scan without fixating on any one object or checkpoint can land in any environment, shipboard or otherwise.

After a good scan is established, the next step to land from a hover is to lower the collective. The aircraft's descent rate is governed by how much collective is reduced. There is no set technique to do this, as the amount of reduction required has many variables, such as wind speed and direction, weight of the aircraft, and density of the air. A rapid descent rate will cause the pilot to increase collective to arrest the descent, which will result in drifting. Also, if the aircraft is allowed to descend rapidly, it can result in a hard landing and damage to the aircraft. Hard landings can cause skid-type aircraft to bounce back into the air, like a spring. A descent rate that is too slow extends the time the helicopter is low to the ground. The potential for drift close to the ground increases with time, and with it the risk of dynamic rollover also increases.

THE NEXT STEP of the landing procedure, the use of pedals to maintain heading and cyclic to eliminate drift, amplifies the difficulty in flying a helicopter. The pedals align the aircraft for landing. All three controls, cyclic (lateral and longitudinal control), pedals (yaw), and collective (vertical lift and power) each affect the other two. For example, if left pedal is added, tail-rotor pitch is increased, producing more thrust. This increased thrust pushes the nose of the aircraft to the left as the pilot desired. In addition though, that increased thrust from the tail rotor pushes the entire aircraft into a drift laterally to the right because of translating tendency. To counter that right drift, a pilot must add left cyclic to maintain position. This tilting of the main rotor by the cyclic to maintain position moves the lift out of vertical, which causes a descent. The pilot then must increase collective, the opposite of trying to land, to compensate for the lost thrust in the vertical axis, or risk landing hard. This additional thrust requires left pedal to keep the nose aligned and to compensate for the increased torque, which starts the whole process over again. This vicious loop of control inputs increases the challenge of a vertical landing.

The third step in the landing is that the rate of descent may slow as the helicopter nears the ground. This slowing is because of ground effect. Student pilots routinely get caught in this region, which is between six inches to two feet off the ground. This slowing descent rate, and the collective reduction required to overcome it, reintroduce drift and the risk of dynamic rollover into the landing. Pilots are taught, and they learn with experience, to set a large enough descent rate at the beginning of the landing. This action compensates for ground effect low to the ground.

The fourth step of the landing directly deals with dynamic rollover. The reduction of collective transfers the weight of the aircraft to the ground to prevent angular momentum from developing, and completes the landing. The rate of reduction also is important. If the rate is too slow, dynamic rollover risk increases. If the rate is too fast, it may feel like the pilot's spine is half the length it used to be.

The consequences of a botched landing are not pretty. The shipboard environment increases the risk of landings for helicopters. Dynamic rollover, mast bumping, damage to the rotors or landing gear, and injuries to the crew are just some of the consequences.

These procedures and techniques from the beginning of pilot training can be used for vertical landings in any helicopter. Ultimately, the pilot who has a sound scan, adheres to the basic procedures and aircraft limitations, and uses proper CRM can land a helicopter in any location or environment.

Lt. Fleenor is the Helicopter Standardization Officer, Training Wing Five.

Don't Fudge it Away

By Maj. Scott Nicholsen, USMC

Over the years and through many billets and deployments, I've learned several truths about flying the AV-8B:

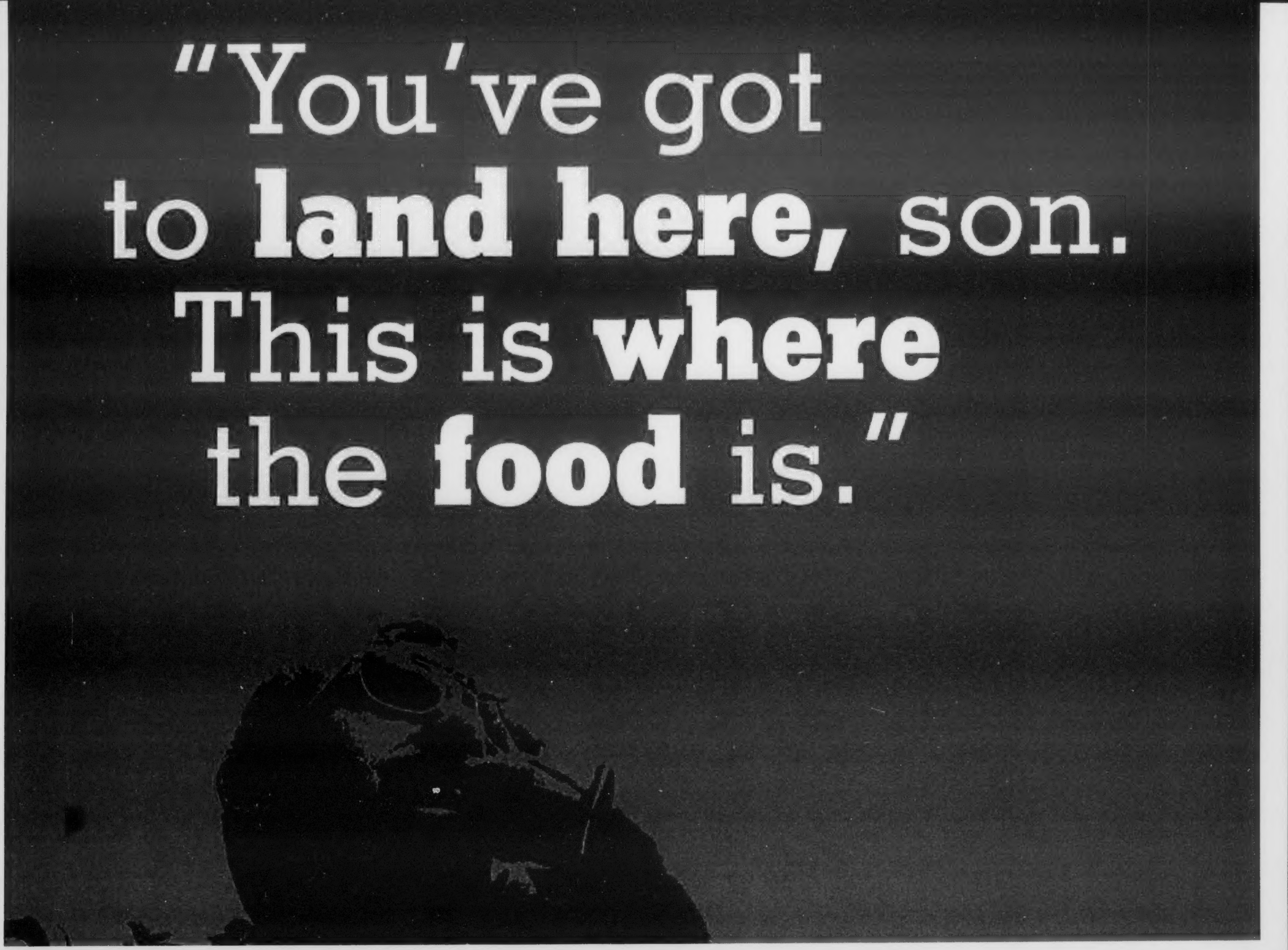
- *Harrier pilots are the best single-seat, close-air-support pilots in the world.*
- *When flying V/STOL, I should always be mindful of the airspeed, AOA, and sideslip death equation.*
- *If I move the nozzles and don't like the response, I should put them back where they were.*
- *500 pounds of computed performance margin really means somewhere between 10 and 1,000 pounds of excess.*
- *For shipboard operations, the AN/SPN-43 air-surveillance radar always will have something wrong with it.*
- *Bugles are the preferred snack treats of LHD air-traffic-control personnel.*
- *Things will be hairy if the LHD is not steady on base-recovery course (BRC), with legal winds three minutes before the visual-initial or instrument-initial-approach fix.*

You probably already believe many of these truths. However, do you know who will be the next pilot in a class A flight mishap? I do. I also know how and why they will crash, and who the flight lead or LSO will be. My experience tells me rumors and assumptions are more prevalent than the actual facts, but do you know the facts?

Harrier Class A flight mishaps in the last 10 years have fallen into two main categories: engine failures and landings involving aircrew errors. The former is just a fact of life for single-engine aviators. It is as true for AV-8 pilots as it was for F4U pilots, and probably will be for F-35 pilots. No amount of training will change this fact.

Pilots, however, have control of their own actions—sometimes they're correct and other times not. Pilot errors are the main cause of AV-8B Class A flight mishaps.

Want to try a fun ready-room experiment? Ask all the pilots with less than 500 AV-8 hours, and less than 15 hours in the past 30 days, to raise their hands. Of that group, ask those planning to


"You've got
to **land here,** son.
This is **where**
the **food** is."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chop to a MEU detachment to stand up. You will have highlighted the groups from which our next mishap pilot will come from: more likely from those standing.

NOW ASK ALL THE PILOTS previously not highlighted to raise their hands. You will have highlighted the group that will have some direct causality in the next mishap, either as a flight lead or LSO. This is also the group who most likely will prevent a major mishap.

Where will the next aircrew-caused mishap occur? It will be in the landing environment. While we've had three mishaps that have occurred on the runway since FY00, there have been nine others within the ship- or shore-landing environment. The AV-8B community must be doing an outstanding job of briefing midair collision, CFIT, G-Loc, and hypoxia hazards because we just don't experience them as often as other aircraft types.

To summarize AV-8B Aircrew Causal Factor Mishaps:

- First tour – Less than 500 AV-8B hours.
- Low currency – Less than 10 to 15 hours in previous 30 days (about double for OIF/OEF long-duration type missions).
- Takeoff/Landing phase - Skill-based and procedural errors.
- Poor CRM and/or time-critical ORM.
- Flight lead or LSO from greater than 500 hour group.
- Sometimes with flyable material failure.
- Shipboard landing mishap when deployed with a MEU.

My experience tells me rumors and assumptions are more prevalent than the actual facts, but do you know the facts?

Why will the next mishap pilot crash? It definitely will be a basic airwork (skill-based) error involving some deviation from established procedures. There probably will be a basic failure of crew-resource management (CRM) or operational-risk management (ORM). The squadron CO or detachment OinC likely will also be found causal because of an ORM oversight. The LSO or flight lead will have had one or more opportunities to have prevented the mishap.

Now that you have the facts, perhaps you can use them to create control measures and improve training. At the very least, you are now aware of who is most likely to fudge it away, where it will happen, and why.

Semper Fi. Stay Marine. Don't fudge it away!

Maj. Nicholsen is the AV-8B, F-35, CAS, and NVD analyst at the Naval Safety Center.

"Mishap statistics indicate that if the pilot operates at a workload level immediately below his saturation point, then a minor emergency or deviation from a routine evolution will result in a higher probability of losing control."

Report of First AV-8 VSTOL Safety Symposium, Naval Safety Center, December 16, 1976.

Just Because You Can
Doesn't Mean You Should

By Lt. William Brody

"Who is the most dangerous pilot?" asked the commodore during my interview with him for the FNAEB process following my Class A mishap. The commodore quickly answered his question with, "The pilot with between 1,000 and 2,000 hours."

I had heard this fact before at some point during my career, but his question was a little more pointed as a result of the circumstances. I mention this information as a pilot with 1,500-plus hours, who now has become one of the most conservative pilots around.

On the day of our Class A mishap, we took off from Chambers Field, Norfolk, Va., for an FRS NFO airborne-intercept-control (AIC) training event. The weather was ideal at takeoff but was expected to deteriorate by our scheduled land time—not so much to hinder training, though.

The standard FRS crew configuration for AIC flights is for two NFO instructors to fly the mission in the combat-information center (CIC), along with two NFO students who swap seats front to back after their AIC runs. All FRS instructor pilots are seasoned, carrier-aircraft-plane commanders (CAPCs), with more than 1,000 Hawkeye hours. They are also senior instructors with more than a year of flight time with student pilots, so this single-piloted configuration is acceptable for AIC events. You could argue it is safer to fly alone than with a student pilot trying to kill you. Hawkeye NFOs receive very little time in the right seat of the aircraft. NFO students only have a handful of hours in aircraft front or back, so flying up front with an NFO student essentially is flying alone.

During the brief, the emergency-procedure (EP) question of the day was on "No Beta Light(s) During Rollout." Beta lights in the E-2C NP2000 configuration let the pilots know conditions have been met to allow the props to go to the reverse range on deck. We briefed I would handle all EPs in the cockpit. This plan is different than the CRM normally practiced with two pilots in the cockpit for emergencies or troubleshooting.

I did not expect the student NFO to touch or do anything for the duration of the flight. My reasoning was twofold. First, I did not want him to do anything wrong. Second, this was one of his highest pressure events in training up to this point: controlling aircraft

in flight, not just in a simulator. His focus for success needed to be on his mission; mine was to fly the plane. My brief to them about cockpit functionality focused on their movement in and out of the seat and cockpit for their front-to-back switch halfway through the event. I did not want them to affect the configuration or condition of the aircraft, their personal gear, or the seat. When they got in the aircraft, we reviewed those items.

With two or three AIC runs left, I dialed up ATIS to get the info for Chambers Field. Although an overcast layer had moved in, the field still was VFR. The runway had changed from 28 to 10, because of increased winds from the north. The winds given by ATIS were within the recommended limits of NATOPS, but right on the edge. I asked for a PAR for my approach numbers; I needed every opportunity to get approaches. While flying with students, the focus is getting their approaches, not mine, so this flight was a good deal. Course corrections given by the PAR controller were challenging, with a good crab to the north for the winds.

At about 300 feet on the approach, I visually took over, removed the crab, and set a wing-down, top-rudder approach. I touched down left mainmount first, then the right, followed by the nose gear just before the short-field arresting gear that was rigged. I pulled back the power levers to flight idle and up to the top of the flight-idle gate. Neither left nor right beta lights came on. I placed the power levers back down to the bottom of the gate and selected max power for a go-around, in accordance with the first step in the EP. On the go, I switched from the final-approach-controller frequency to tower and asked

for the downwind. With approval, I turned downwind and did the landing checklist.

On the downwind, I noted a significant crab to the north to hold a downwind track. I told the crew we would try it again. The engine and props functioned smoothly, with no reason to think the absence of beta lights was caused by an actual malfunction.

A pilot can induce a failure of the beta system for a variety of reasons. It is more common for a beta failure to be caused by inputs, rather than system malfunctions. I was convinced this was the case, and the lights would illuminate on the next try. We had plenty of gas and had no reason to make an arrested landing per step two in the EP. The community's mindset with respect to beta failures was that it can be pilot-induced, due mostly to power-lever manipulation. A second or third try would result in beta-light illumination and correct system operation.

I called tower for the full stop, and they called the winds gusting out of the north. Having just seen the approach to final, I was well within my comfort zone for another landing. Because of the winds, I didn't so much roll out of the approach turn as much as just using right rudder to point the nose down the centerline while holding down the left wing.

I TOUCHED DOWN nearly the same way as the previous attempt, with the nose gear just hitting before the short-field gear. I again brought up the power levers to the top of the gate. The beta lights flickered on, off, then back on and remained on. I told the crew, "I have betas," and continued to move the power levers toward ground idle. About an inch or two back from the gate, the beta lights extinguished, and the master-caution light illuminated, with no associated lights on the master-caution panel. The master-caution light, along with the loss of beta lights, means the master caution is prop-related. I looked up at the propeller panel to see both EPC fail lights illuminated, indicating a system fault.

I was out of the realm of NATOPS with respect to the No Beta Light(s) on Rollout procedure. I could not go around because I already had begun to stop. I didn't know that if the prop system failed with the power levers in ground range, I would get flight-range governing from the EPC, or get the backup governor (BUG) if I decided to go back into the flight range. We teach pilots from day one that, if you commit to an abort, you do not ever change your mind and try taking off again.

Moving the power levers from ground idle to flight idle, and then moving them up to max power in an attempt to fly again, would lead me outside of the performance-numbers range I had planned for takeoff and land data. By the way, roll-and-go landings are prohibited by NATOPS. "Perform arrested landing" is the next step in the EP after the go-around, if arresting gear is available. The short-field gear was behind us and not an option. The next step is power levers to flight idle. I put them back up to flight idle and felt the reduced deceleration, if not a little acceleration. In either case, it hurt more than it helped.

Pride in our ability to get the job done is an opposing force to practicing thorough ORM and finding the most conservative yet effective approach and sticking with it.

What I did have was symmetric thrust (both engines providing similar thrust in magnitude and direction). Asymmetric thrust and the directional-control challenges it provides is the whole idea behind not bringing the power levers to ground idle or reverse without beta lights.

Aircrew do plenty of second-guessing on the merits of shutting down one engine, both engines, or neither engine. Second-guessing as distance-remaining boards fly by with little deceleration is more difficult. After looking up to see the dual EPC-fail lights, I looked outside to see a left to right drift. I took my left hand off the flight controls and grabbed the nosewheel steering. My right hand came off the power levers and held the yoke to the left. We had no time for second-guessing the merits of each step of the procedure when holding on to the nosewheel, the yoke hard over to the left, full left rudder, and the brakes.

Centerline and stopping are the only things that matter in life.

The next three steps in the procedure are: flaps as required, brakes as required, and arresting hook as required. I had the brakes and the hook, but did not raise the flaps. The purpose of raising the flaps is to place the total aircraft weight on the wheels, increasing braking effectiveness. A couple of things made this step difficult. I did not have another hand to reach for the flaps, and my left mainmount failed, as I saw parts of it rolling down the runway ahead of me; braking effectiveness already was compromised.

After the tire separated, the plane started a more significant drift to the right. I saw the long-field gear coming up. I wasn't sure I could stay on the pavement to reach it, but I dropped the hook, hoping to catch the wire. After getting the hook down, I pulled both T-handles, anticipating we would leave the paved surface. The aircraft departed the runway at the arresting-gear engine, collided with it, and settled into the dirt. We rotated 120 degrees to the left, slid, and stopped, with the momentum of what was left of the props beating to a halt in the dirt. All five of us got out of the aircraft without a scratch.

When faced with a challenge, many aviators ask, "Why not?" Getting the job done is what most aviators do. I do not credit the question, "Why not?" with my mishap. The flight was thoroughly planned and briefed. The plan had been executed in this fashion, including crew configuration, for nearly a decade before our mishap. The mishap, however, has changed the way I forever will apply this question. Most aviators who have not been involved in a mishap do not think about the scrutiny that can fall upon every decision made before and during the event. The largest question in my mind, as I make decisions now, is not, "Can we do this?" but, "Should we do this just because we can?" Most would agree the answer is almost always, "Yeah, we can get that done."

It usually takes a more senior aviator to rein in the motivated JO and say, "Sure we can do this, but we probably shouldn't, and therefore we won't." To be clear, I would fly this event again. The plan was sound, and the execution, right up to the last minute, was flawless. But, I would do few things differently with the question, "Should we do this?"

With four NFOs in the aircraft, two with more than 1,000 hours, and two with less than 50, an NFO with more than 1,000 hours probably should be in the cockpit for the critical phases of flight. I would have briefed the flight differently with respect to duties in the cockpit if the instructor NFO was up front. I certainly would not tell him or her, "Do not touch anything; I will take care of it."

I have briefed with an experienced NFO flying up front before, and they are capable of performing the CRM items that make this a true dual-piloted aircraft. Sure, I can make this crosswind landing: perfect wing down, top rudder approach, perfect fuselage alignment, and touchdown right on centerline. After the rollout, an experienced NFO would have known what, "Hold the yoke forward and to the left for the crosswind," would have meant. I would not want the NFO student to do anything, but an NFO instructor—yes. I can fly this aircraft alone as long as things go well, but when they do not, it's nice to have another set of hands available to help.

I CAN JUSTIFY NOT DOING what NATOPS said to do with respect to the No Beta Light(s) on Rollout procedure. I was confident my decision-making and actions would stand up to scrutiny. I stood by my decisions from the start of the safety investigation, right up to the end of the FNAEB. It is a little more sobering to sit across the desk from the two-star, who holds your career in his hands, when he says plainly, "Step two says perform arrested landing. You chose not to. As a result, an aircraft is destroyed."

Mishap-Free Milestones

VR-57 150,000 hours 32 years

Up to that point, no one, besides me, had put their finger so squarely in my chest. Yes, I could troubleshoot and try to get beta lights back. Should I? If I just had dropped the hook, I most likely would have taxied back to the hangar following the field arrestment and wrote up a MAF for the beta lights failing to illuminate. We would have debriefed and gone home.

I am grateful that leadership allowed me to continue flying. I did promise that, if returned to a flight status, I always would take the most conservative approach. I am still going to get the job done, but I will have to decide if I can get it done in a safer or less risky way, versus the easiest or quickest way we've always done it. The path of least resistance may not always end with the least pain. It is easy to ORM ourselves into inaction. That is not the point of asking the tough questions. Pride in our ability to get the job done is an opposing force to practicing thorough ORM and finding the most conservative yet effective approach and sticking with it. Take it from me, you do not have a lot of pride left when you are standing in the grass, looking at the wreckage of what could be the last naval aircraft you ever fly.

It is a lot easier to take the jabs from your fellow aviators over taking a field arrestment for what might be nothing, than to tell the skipper, commodore, and CNAL that you single-handedly destroyed their aircraft, all because you thought you could get it all done.

Lt. Brody flies with VAW-120.

By Ltjg. Eric Watt

As with any product that has been around for decades, aircraft develop certain commonplace discrepancies. Most Orion maintenance-action forms (MAFs) tend to be discrepancies a senior maintainer probably has seen several times.

We had an airspeed problem during a training flight involving multiple touch-and-goes. During takeoff in the P-3C, power usually is set by the flight engineer after brakes are released. The copilot monitors airspeed during takeoff roll and makes three calls: "80 knots," "refusal," and "rotate." The copilot calls out "80 knots" to signal the pilot to check his airspeed and verify sufficient power is set for takeoff. Rotate speeds in the P-3C vary from 115 to 130 knots, so this checkpoint provides a safe buffer to abort the takeoff.

At training weights, rotate speed is 115 knots. After our initial takeoff, the copilot—the instructor pilot in this case—said the aircraft was slow during the climb to pattern altitude. The pilot looked down at his indicator and saw 160 knots, the normal climb-out speed to downwind. The copilot stated his airspeed indicator showed 145 knots. The maximum allowable difference between pilot and copilot airspeed indicators in the P-3 is five knots. After some discussion at pattern altitude and more cross-checks to verify the problem, the instructor pilot landed the aircraft and returned to the line.

The airspeed-indicator system uses both pitot (ram air) and static (ambient air) inputs. Initial troubleshooting focused on the dual pitot probes located below the nose radome. During climb and descent, where the airspeed discrepancy was noted, there is an angular difference in the airflow through the probes, as compared to level flight. This disrupted flow of air is negligible under normal circumstances; however, an internal problem with the probe could interfere with airspeed indications. Consequently, the pilot and copilot pitot probes were replaced, and the system operated normally.

The following flight also reported an airspeed split. Maintenance personnel determined some particulate matter could be in the system, so they purged it, using

Photo by PH2 Richard J. Brunson. Modified.

drain ports located in the aircraft's belly. They found some bits of Teflon tape (which seals the connections) in the lines that feed ram air to the instruments. The aircraft airspeed system checked normal on deck and once again was released for flight.

ALONG WITH THE RECURRING AIRSPEED split, the next crew noted that the copilot side airspeed seemed to "ratchet" in conjunction with an altimeter split of around 150 feet, and then would eventually disappear. This gripe pointed toward the static side of the system, because the altimeter only uses a static input. After removing components connected to that system, mechs cleared the lines with pressurized air, similar to the procedure used for the pitot system. They found five different leaks in the line. The static system, however, operates on a vacuum, rather than on pressure, so the air-data test set the maintainers use for troubleshooting was unable to find all of the leaks. A special piece of equipment, used to amplify small sounds like air leaks, was flown to the deployed location to find the last few holes. After we patched the tiny holes, the system operated normally, and the aircraft returned to fully mission-capable status.

Pilots learn early on in flight training the most challenging and unique phases of flight are takeoffs and landings. When the aircraft configuration is being changed, along with increasing or decreasing airspeed, pilots must fly close to stall speeds. P-3 rotate speeds can be as little as five percent above minimum air-control speed (Vmc-air). In the above case, had there been a problem with one (or two) engines during takeoff, the aircraft would have been only 10 knots above Vmc-air, and the airspeed indicators would have shown a 15-knot difference.

Sometimes it's easy to overlook the effort that goes into keeping a 20-, or 30-, or even 40-year-old aircraft flying. When difficult problems such as this pitot-static discrepancy are solved, we definitely appreciate the maintainers.

Ltjg. Watt is a pilot with VP-45.

Bravo Zulu

Left to right: SSgt Adgin Pjanic, Cpl Semane Mengistu, SSgt Joseph White, Capt Ryan Lynch, GySgt Douglas Mederos

THE CREW OF AIRCRAFT 05 was scheduled to conduct day-into-night, helicopter aerial-refueling operations. Before takeoff, the crew had an electrical fire in the cockpit's nose-electronics bay. During preflight, the copilot had noticed the UHF circuit breaker was popped and reset it. With the auxiliary-power plant (APP) and the generators (Nos.1 and 3) on-line, the pilot saw electrical arcing in the KAPTON wiring bundle near his left leg. The crew secured the APP and generators. Once shut down, the crew reported the fire was out.

To identify the cause, the crew restarted the aircraft with the UHF circuit breaker pulled. While on-line, all indications were normal. The crew then reset the UHF circuit breaker and flames immediately appeared in the same wire bundle. The crew immediately pulled the circuit breaker and the flames went out.

Avionics personnel determined the cause of the fire was a single strand of KAPTON wire routed from the UHF circuit breaker. The fire burned through the insulation that shielded four other single-stranded wires in the same bundle. The wire that caused the arcing was rubbing on the airframe in the vicinity of the comm 2 relay transmitters.

The crew shut down and egressed the aircraft with no injuries. Faulty KAPTON wiring has been and continues to be a hazard to the CH-53E community.

CAPTAIN CALEB B. THORP, USMC, a flight instructor with VT-2 at NAS Whiting Field, Fla., was the runway duty officer at Navy Outlying Landing Field Brewton during day landing operations. Several T-34C aircraft were operating at the landing field, which is used by civilian and military aircraft.

Captain Thorp observed a civilian aircraft on a straight-in approach. The aircraft had not established radio contact as required by local procedures and was on a collision course with a T-34 aircraft descending from the landing pattern. Recognizing the crew in the T-34 could not see the civilian aircraft below them, Capt. Thorp immediately directed the T-34 to discontinue its approach. The crew complied, climbed away from the runway and avoided a midair collision.

In accordance with local procedures to provide safe altitude separation, Capt. Thorp instructed all military aircraft to climb to a holding pattern while the civilian aircraft landed.

MAJOR WES SPAID, LtCol. Chandler Nelms, Sgt. Zachary Hoag, and Cpl. David Kroll were flying as Dash-4 in a division of MV-22Bs from VMM-263(REIN), 22d Marine Expeditionary Unit, in support of an amphibious-assault demonstration during the Bright Star Exercise near Alexandria, Egypt. The crew departed from USS Bataan (LHD-5) with 24 Marines.

After transitioning to airplane mode and join-up, the crew felt an unusual moderate vibration. A "rotor load high" caution appeared on the engine indications and crew-alerting system (EICAS). The crew looked at the end of the left wing and observed the entire nacelle shaking up and down. NATOPS procedures for a "rotor load high" caution calls for a reduction in the severity of the current flight maneuver and for a landing as soon as possible, or an immediate landing if severe vibrations are present. After completing NATOPS procedures and flying straight and level, the caution failed to clear from the EICAS. The crew broke away from the formation and returned to Bataan for a landing as soon as possible. The crew made a delayed conversion and a stern approach to a no-hover landing on spot 9, as recommended by NATOPS.

Left to right: Maj. Wes Spaid, LtCol. Chandler Nelms, Sgt. Zachary Hoag, Cpl. David Kroll.

Maintainers found the pitch-lock sockets on two of the left hand proprotors, which hold the proprotors in the correct pitch during blade-fold and wing-stow, had broken off and wedged between the blade grip and elastomeric pitch bearing. This situation caused binding that created an increased one-per-revolution vibration, triggering the "rotor load high" caution.

LIEUTENANTS SEAN COOPER and Mary Robinson, along with AWR2 Daniel Snapp, the HSL-51 Det. 5 crew of Warlord 715, embarked in USS McCampbell (DDG-85), returned from flight, reporting a strong 1-per vibration.

While mechs were folding the SH-60B's blades, they couldn't position the blue blade within tolerance for folding. They discovered excessive wear on the upper pitch-control-rod (PCR) retaining bolt, which connects the PCR to the spindle-pitch-change horn. The bolt had seized, and the pitch-change-horn bushings had rubbed well into the bolt, requiring replacement of the bolt, the upper PCR elastomeric bearing, and spindle.

Continued flight eventually would have resulted in catastrophic failure of the bolt, separation of the PCR from the spindle, and loss of a main rotor-blade-pitch control. This crew's report of unusual vibrations potentially prevented the loss of aircraft and crew.

Lt. Mary Robinson, Lt. Sean Cooper, and AWR2 Daniel Snapp.

Photo by LCdr. Brian Cepaitis, VFA-22.

27 Minutes in Hell

By Lt. Brandon Lenhart

Aviators are trained to recognize and manage hypoxia and fatigue, but we're not as familiar with other aeromedical factors. One such factor, often stressed to our flight-deck personnel but rarely discussed in the ready room, is heat exhaustion. On a hot, July day in the Arabian Sea, my pilot and I learned how serious, and possibly lethal, heat exhaustion could be.

VFA-22 was flying missions from USS *Ronald Reagan* (CVN-76) in support of Operation Enduring Freedom. My pilot and I, both experienced aircrew, were manning one of our two-seat FA-18Fs as the lead aircraft for a close-air-support mission. On the flight deck, the outside-air temperature was 92 degrees F, with a heat index of 118 degrees F—conditions not uncommon in this region.

We had a quick man-up in side-number 105. We broke down early and were taxied to cat 4, where we waited about 20 minutes for the launch. With the summer haze, *Reagan* was operating Case 3, and as I keyed the mike for the "passing 2.5" radio call, we heard a "deedle, deedle" master-caution tone. An AV AIR HOT caution was displayed on the left DDI because of insufficient airflow and excessive temperature in the avionics bay.

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Seeing this caution is common while sitting on a hot flight deck during the summer. Coming up on the power to increase ECS flow usually fixes the problem. When airborne, the caution can be a showstopper, but it usually clears after you complete the pocket-checklist (PCL) procedures. My pilot turned off the radar and cycled the bleed-air knob, while the throttles still were at mil power during the climb-out. The caution did not clear. I opened my PCL, and we began the procedures.

THE PCL RECOMMENDED WE MAINTAIN 300 to 325 knots for optimum cooling. The next step is to place the environmental-control-system mode switch from NORM to OFF/RAM. This deploys a ram-air scoop for cabin pressurization and airflow and also energizes an avionics cooling fan. This procedure always is followed by placing the AV COOL switch to EMERG to prevent burning up our flight-control computers and then setting the CABIN TEMP knob to full cold. After these steps, the caution cleared, but we were disappointed because our jet was down, and we wouldn't be flying over the beach. The spare would go in our place. This disappointment soon would be replaced with a feeling of panic.

After following the procedures, we were left with an unpressurized cockpit that had no airflow. I immediately felt the cockpit rapidly heat up. Within two minutes of completing the procedures, our cockpit temperature had risen above 100 degrees, and I did not feel right.

"We need to land now," I told my pilot, as I realized this "land as soon as practical" procedure was becoming a "land as soon as possible" emergency. Without asking any questions, he immediately started a descent. I coordinated with the rep and told him that we could not wait until the next recovery; we needed to recover same cycle. Our request was granted about the time the AV AIR HOT caution reappeared. By now, we were drenched in sweat. The displays were radiating heat that I could feel on my hands, face and through my steel-toed boots. I set the radalt for landing, and we turned off all unnecessary avionics and displays, except the HUD. The temperature kept climbing, and the cockpit felt like an oven.

We were sequenced in for landing and heard the unwelcome, "Bolter, bolter, bolter, hook skip," as we hook-skipped all three wires. We trapped the next time around after a 27-minute flight. Both of us felt nausea, headache, shortness of breath, heavy sweating, and uncontrollable shaking of our hands and legs.

We raised the canopy and estimated at least a 30-degree temperature drop. We were happy to be on deck, but both of us barely could keep our balance and felt ill. We estimated we had had cockpit temperatures in excess of 130 degrees F. After the flight, we reported to the flight surgeon who said we had heat exhaustion. He recommended rest and plenty of fluids.

We learned that drinking water can help, but the only way to prevent heat exhaustion is to escape the heat. Obviously, there are limited options in the cockpit. My pilot and I talked about what had happened and the lessons learned in a postflight debrief. We both admitted feeling in extremis and that canopy jettison had crossed our minds. Our NATOPS officer asked if we had referenced the cockpit-temperature-high procedures, which we did not even know existed. It is an obscure procedure that rarely is used or discussed, and it should be referenced in the AV AIR HOT procedure.

As a community, FA-18 aircrew should familiarize themselves with AV AIR HOT and cockpit-temperature-high procedures. Everyone working in the carrier environment should be familiar with the symptoms of heat-related illness. When the carrier enters an unusually hot environment, we should review those procedures to make sure we don't damage the equipment—or ourselves.

Lt. Lenhart flies with VFA-22.

Decision Making
Assertiveness
Mission Analysis
Communication
Leadership
Adaptability/Flexibility
Situational Awareness

FAILURE ON Dirty-up

By Capt. K. E. T. Igler, USMC

Our flight began as a standard night mission over Mosul, Iraq; no new tasking, no problems with the tanker, and no system issues. I was riding in ECMO 3 (backseat), our flight doc in ECMO 2 (backseat), and ECMO 1 duties fell to a captain. Our pilot (a major) was the senior member of our EA-6B crew. The rest of us were fairly junior.

VMAQ-3 was about a month into our OIF deployment, and we were settling into a routine. Missions, like this one, were getting boring: Fly out to a waypoint, jam in circles for hours, tank, jam in circles and fly home. Only after RTB and a normal descent into Al Asad, did our excitement begin.

ECMO 1 did descent and combat checks on the way in, and we got a standard handoff to approach. Al Asad has two parallel, offset runways (27L/9R and 27R/9L), and was landing 27L, with 27R closed for rubber removal. As with most night flights in Iraq, we could see the field almost 80 miles out on goggles. We did a standard left break and ended up on downwind, slowing to bring down gear and flaps.

The pilot put down the gear and flap handles. The procedure is to check the wheels down, and then look to see the slats moving. We had three-down-and-locked, and the pilot called the slats moving on the left. ECMO 1 called the slats moving on the right, but then got a closer look and called the slats partially were extended, but no longer moving. This irregular call and a little apprehension in his voice cued our pilot to double-check

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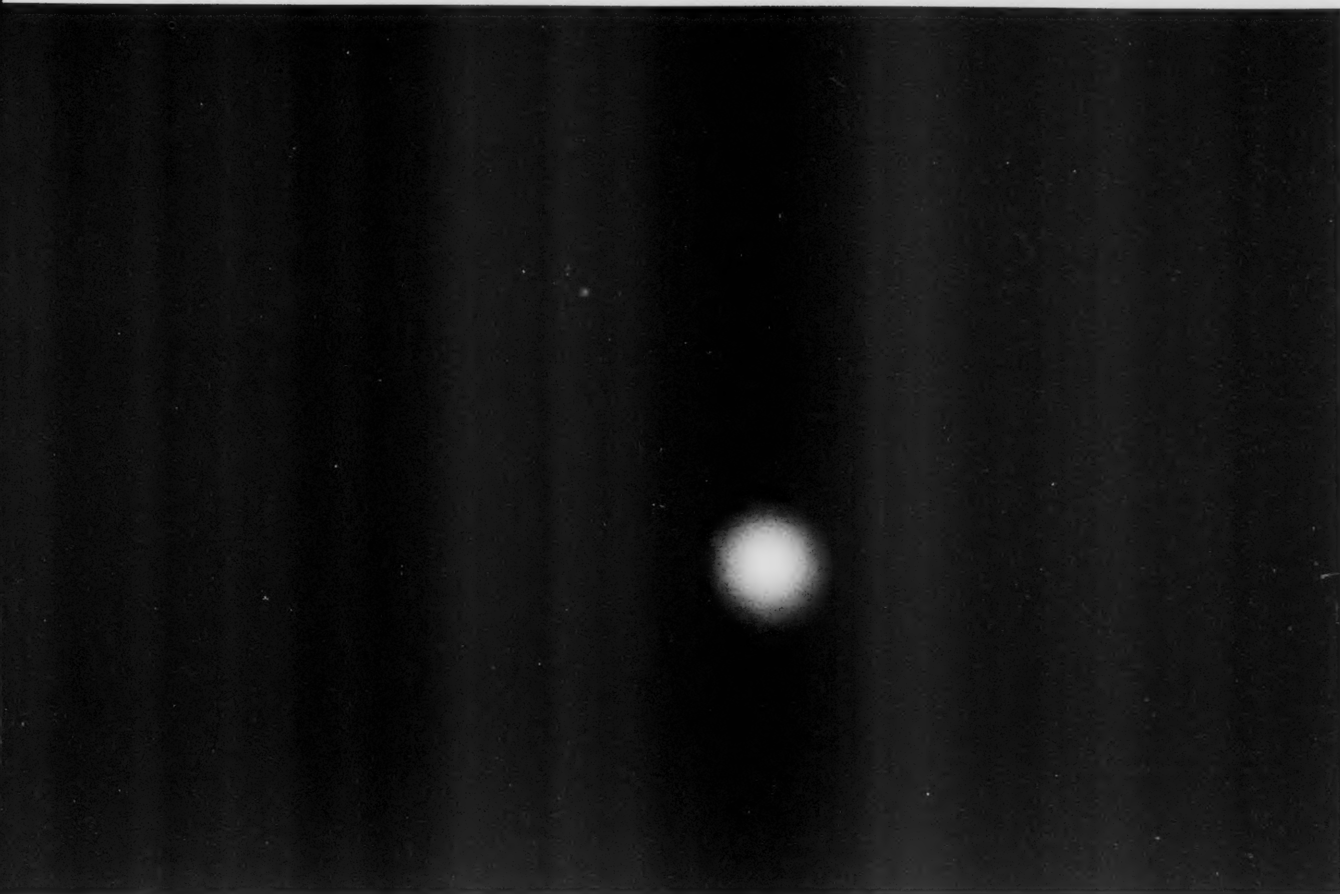

his side, along with the flaps- and slat-position indicator. He saw the slats were not fully extended, and both slats and flaps were barber-polled in the indicator windows. After a quick scan of the instruments, he saw we had lost hydraulic pressure in the combined-hydraulic system.

In the Prowler, the hydraulic system is divided into the flight and combined systems. The flight controls are on the flight system, and the combined system has just about everything. We had lost key items for landing, including the normal flaps and slats and normal brakes. Fortunately, we had our gear down, which saved a lot of time and heartache.

TOWER CLEARED US TO LAND as ECMO 1 called, "three down and locked," but before we realized we had lost the combined-hyd system. Our pilot quickly took command of the situation. ECMO 1 and I broke out the checklist, and both ECMOs looked at them. ECMO 1 told tower that we would need the delta pattern and that we were not continuing to land. We were cleared to 5,000 feet north of the field. The pilot quickly realized we would not have normal brakes, and would require a trap.

ECMO 1 also asked tower about the status of the gear. Tower said the short-field gear was rigged for 9R, so we made a teardrop approach to land on 9R. This decision was the result of a number of factors. First, we had only enough gas for 20 minutes with the gear down. Keep in mind, we cannot retract the gear nor would we want to, and we did not have time for them to rig the short-field gear for 27L. Second the winds were light, so a tail wind was not a major concern. Finally, circling north to get to 9R gave us time to complete our checklists and tasks, and to configure the aircraft without having us circle too long given our fuel state.

A Prowler from VMAQ-4 called tower for the break after we began circling north. Tower was quick to ask us if they could land first, or if we wanted to delay them until after we landed. Considering that once we caught the wire, the field would be shut down (remember, 27R was closed for rubber removal), we told tower the other

aircraft could land ahead of us. This decision gave us more time to circle north and configure. Had he not allowed them to land, they probably would have diverted to Balad, depending on how long we were in the wire.

After the initial excitement and the comms died down, I called base and maintenance to tell them our situation and that we'd need a tow from the wire. Base and maintenance did well by staying out of our cockpit during the emergency. We fed them enough information, but not too much to tie up the radios. The ODO asked if we needed an LSO, but the pilot declined because of our limited time and with a low-fuel state. Maintenance initially wanted to know more about our situation, but held further questions after a "stand by" call from us.

After circling north and leveling off at 5,000 feet, ECMO 1 and I confirmed we were on the same page in the PCL, with the same emergency: landing with combined hyd failure. ECMO 1 read the checklist, our pilot performed the actions, and the backseat backed up on basic airmanship and checklist items. ECMO 1 quickly read the checklist items, disregarding the gear items that did not apply to our situation. The checklist called for us to electrically extend the flaps and slats via the emergency system (which we did without incident), and drop the hook. We were configured for landing.

Tower cleared us for the trap on 9R, and we set up for a six mile, straight-in approach. As we rolled in for the straight-in, I looked up the gear's location on the runway. At Al Asad, it is close to the approach end, about 500 feet, so you need to touch down on the piano keys to have a chance at the wire. We had no glideslope information because no PAR was available for 9R, or enough time to get an LSO on station. To get an idea for glide slope, ECMO 1 put the runway threshold in the nav, so the pilot could do an internal GCA. Our pilot said if we missed, we'd have enough gas for one pass and then have to land the second time. With our internal GCA and a little zen from our pilot, we touched down just past the piano keys and caught the wire. The pull was quite a bit more than I expected—not as much as the boat, but more than what I've felt before from a field arrestment.

After we stopped, our next concern was for other aircraft landing at Al Asad, because we effectively were shutting down the field. We worked with our maintenance and tower to get a tow back to our line. We left the engines running, so we could talk with tower, our base and maintenance. Fire rescue was a little late on the scene; they had responded to a spill at the fuel farm, so it was a busy night for them. We had tower tell crash-fire-rescue that we had no brakes, and not to tow us until after our ground crew had arrived. That message never was relayed. After getting towed backwards by the wire, and some yelling, we got across to them we did not have brakes and wanted to wait. We managed to stop via the aux brakes, although we didn't want to use them because of application limits. Our maintenance crew arrived and towed us back to our line.

We worked well as a crew, and handled the many tasks that occur with an emergency like this: comms with multiple agencies, EPs, airmanship and PCL checklists. We acted in much the same roles that we practice in our EP sims. The flight doc kept his questions to a minimum and followed the situation as it progressed (he even told me to turn off the scanner). On the ground, base and maintenance kept out of the cockpit, and asked only questions that were required about our situation.

We debriefed several items that could have been handled better. Our plan, if we had missed the gear the first time, could have been more clearly stated. Because of our low-fuel state, had we missed a second time, we would have had to ride it out using the long runway, air breaking, and aux brakes to stop. The runway threshold could have been put in the flight plan much earlier (it was in at about two miles to touch down), and would have given the pilot a better indicator of his initial glide slope as we came in on a six-mile final. We later learned the short field gear for 27L was gone; it wasn't posted in the NOTAMs, nor had it been taken out of the approach plates. Shortly after our flight it was posted in the NOTAMs.

This event is a perfect example of how NATOPS procedures, SOP, and CRM can work together to keep an emergency from getting out of hand. They served as a perfect guide for what we needed to do. Our pilot's quick call on the status of the gear was due to a depth of NATOPS knowledge, and it enabled us to land when we had little fuel to play with. CRM was a big factor as well. Everyone played the part we brief for emergencies: The pilot handles boldface and keeps the jet flying, ECMO 1 backs up the pilot on boldface items and breaks out the checklist, and ECMO 3 backs up the pilot with altitude and airspeed and follows along with ECMO 1 on checklist items. We did the old mantra: aviate, navigate, and communicate, with checklists as a distant fourth, exactly in that order without even thinking about it.

Capt. Igler flies with VMAQ-3.


"THE KIND REAL AVIATORS LIKE"
BROWNSHOES IN ACTION COMIX
By Lt. Ward Carroll
VF-3.14 finds itself in need of an LSO as "Ragin'" Mike Kagin abruptly drops his letter . .
"Hey, but don't worry! I'm a team player! I'll give you all the straight gouge in my passdown."
"Sounds good to me, "Ragin'" Mike."
LSO
LSO STRIKER
Items in "Ragin'" Mike's passdown . . .
The secret LSO handshake
1
(Make the spock sign)
2
(Shake three times)
(Symbolizes the three wire)
3
(Both do backflips)
(Real reason for padded area next to platform)
And don't forget daily changing MIC clicks on the ball
The LSO accountability matrix
"Anyone seen "Ragin'"?"
"I think he's out waving the attack guys, XO . . ."
"Man, that A-6 is low! I wonder if they can see me? Hi! Hello! Hello!"
"PLEASE "Ragin,'" not while I'm teeing off . . ."
Items not in "Ragin'" Mike's passdown
The pinpoint brief
"Okay, who was out there? Wigit? You freened at the ball call, a little high in the mungdud, ease gun with a half twist, fly through the wake to a taxi one bolter . . ."
"How's that?"
"Ah . . . It was kind of dark out there, and I couldn't really see what I was writing."
THE FIGHTING 1'S
LSO
"You were in an S-3, right?"
The Northern Wedding flex-deck
"What do you think, Doc?"
"Have some corpsmen carry him to the ninth deck and thaw out."
LSO . . . It's a tough job, but you get out of watch if you do it!

We spend so much time

focusing on getting the mission done,

that the landing which brings us back home

is a given.

IS IT REALLY?